

COVID-19 SENTINEL HOSPITAL SURVEILLANCE UPDATE

SOUTH AFRICA WEEK 43 2020

OVERVIEW

This report summarises data of COVID-19 cases admitted to sentinel hospital surveillance sites in all provinces. The report is based on data collected from 5 March to 24 October 2020.

HIGHLIGHTS

- As of 24 October, 92420 COVID-19 admissions were reported from 605 facilities (357 public-sector and 248 private-sector) in all nine provinces of South Africa. DATCOV coverage is now 99% of public and 100% of private hospitals that have had COVID-19 admissions. There was an increase of 17 additional public hospitals reporting and 4855 additional admissions reported since the last report, although these mainly reflect historic admissions and not new admissions. There were 43602 (47%) and 48818 (53%) admissions reported in public and private sector respectively. The majority of COVID-19 admissions were reported from four provinces, Gauteng (28885, 31%), followed by Western Cape (19334, 21%), KwaZulu-Natal (14533, 16%) and Eastern Cape (12078, 13%). Hospital admissions peaked in South Africa in week 29 and 30.
- Of the 92420 admissions, 5116 (6%) patients were in hospital at the time of this report, 71653 (78%) patients were discharged alive or transferred out and 15651 (17%) patients had died. There were 873 additional deaths since the last report.
- Of the 85664 COVID-19 patients who had recorded in-hospital outcome (died and discharged), the case fatality ratio (CFR) was 18%. On multivariable analysis, factors associated with in-hospital mortality were older age groups; male sex; Black African, Coloured and Indian race; admission in the public sector; and having comorbid hypertension, diabetes, chronic cardiac disease, chronic renal disease, malignancy, HIV, current and past tuberculosis, and obesity. Compared to the Western Cape Province, individuals hospitalised in Eastern Cape, Free State, Gauteng, Limpopo and Northern Cape provinces were more likely to die in-hospital.

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METHODS

DATCOV, sentinel hospital surveillance for COVID-19 admissions, was initiated on the 1 April 2020. Data are submitted by public and private hospitals that have agreed to report COVID-19 admissions through DATCOV surveillance in all nine provinces of South Africa. A COVID-19 case was defined as a person with a positive reverse transcriptase polymerase chain reaction (RT-PCR) assay for SARS-CoV-2 who was admitted to a DATCOV sentinel hospital. An individual was defined as having severe disease if treated in high care or intensive care unit (ICU), or ventilated or diagnosed with acute respiratory distress syndrome (ARDS). Case fatality ratio (CFR) was calculated for all closed cases, i.e. COVID-19 deaths divided by COVID-19 deaths plus COVID-19 discharges, excluding individuals who are still admitted in hospital.

Data are received from all private hospitals nationally. As new hospitals join the surveillance system, they have retrospectively captured all admissions recorded although there may be some backlogs in retrospective data capture. There were 17 additional public hospitals and 4 additional private hospitals reporting COVID-19 admissions since the last report. As of 24 October 2020, a total of 605 facilities submitted data on hospitalised COVID-19 cases, 357 from public sector and 248 from private sector (Table 1). This reflects 99% and 100% coverage of all public and private hospitals respectively that have had COVID-19 admissions.

Table 1. Number of hospitals reporting data on COVID-19 admissions by province and sector, South Africa, 5 March-24 October 2020

Name of province	Public Sector	Private Sector
Eastern Cape	82	17
Free State	35	20
Gauteng	38	90
KwaZulu-Natal	63	45
Limpopo	34	7
Mpumalanga	24	9
North West	12	12
Northern Cape	13	8
Western Cape	56	40
South Africa	357	248

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RESULTS

Epidemiological and geographic trends in admissions

From 5 March to 24 October, a total of 92420 COVID-19 admissions (4855 additional from last report) were reported from 592 facilities in all nine provinces of South Africa. Of these admissions, 43602 (47.2%) and 48818 (52.8%) were reported in public and private sector, respectively. Initially, most admissions were reported in the private sector; from week 16 a higher proportion of total admissions was reported in the public sector; and since week 27 a higher proportion was again reported in the private sector. There has been a decrease in reported COVID-19 admissions since the peak in weeks 29 and 30 (Figure 1).

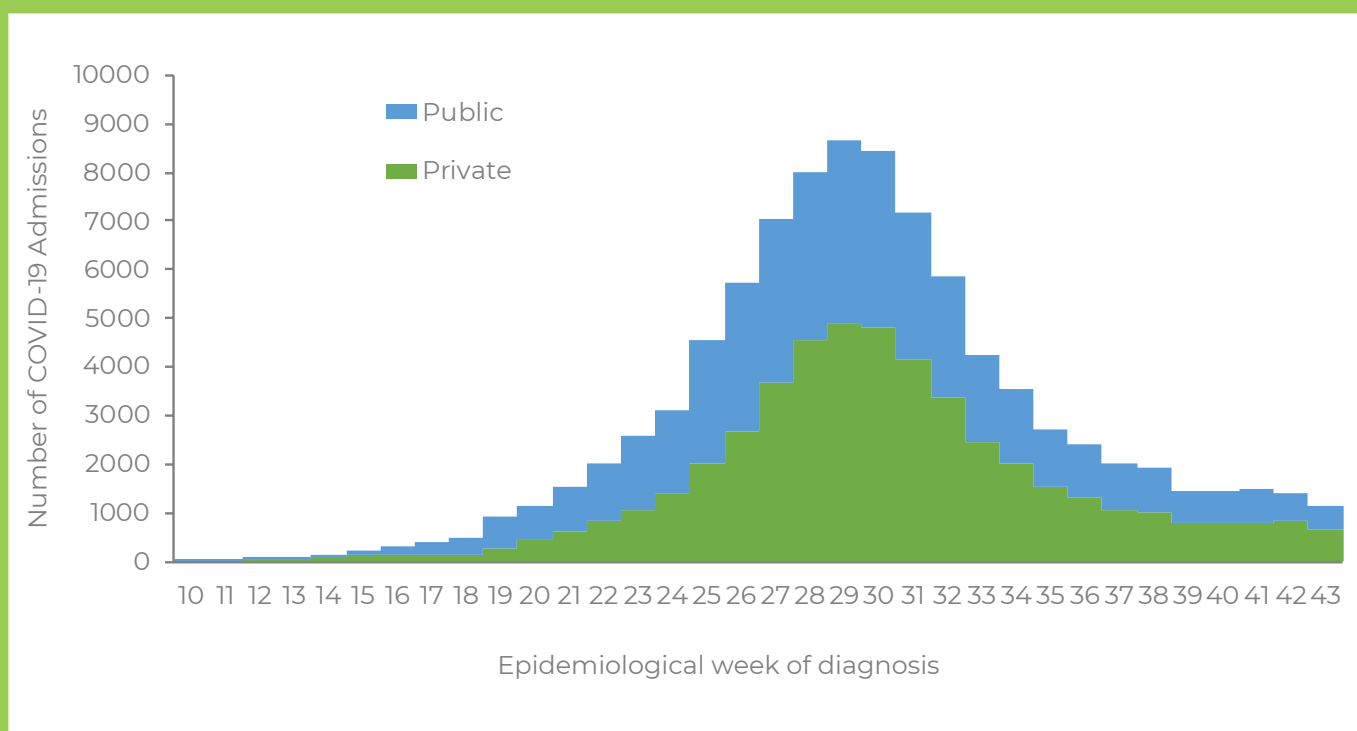


Figure 1. Number of reported COVID-19 admissions by health sector and epidemiological week of diagnosis, 5 March-24 October 2020, n=92420

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The majority of admissions (74830/92420, 81.0%) were recorded in four provinces, with the highest number reported in Gauteng (28885, 31.3%), followed by Western Cape (19334, 20.9%), KwaZulu-Natal (14533, 15.7%) and Eastern Cape (12078, 13.1%) provinces (Figure 2).

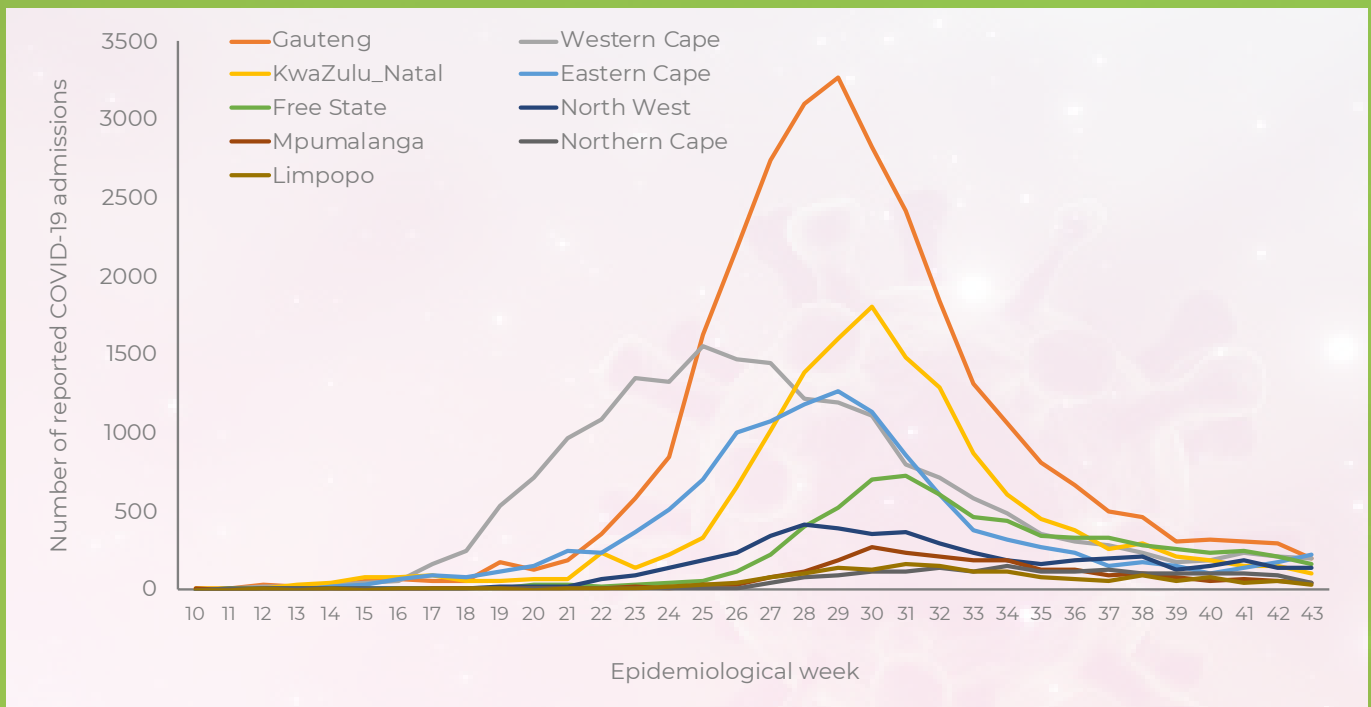


Figure 2. Number of reported COVID-19 admissions, by province and epidemiological week of diagnosis, South Africa, 5 March-24 October 2020, n=92420

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DEMOGRAPHIC AND CLINICAL CHARACTERISTICS OF COVID-19 ADMISSIONS

The median age of COVID-19 admissions was 52 years (interquartile range [IQR] 39 – 63). There were 3187 (3.5%) admissions in patients 18 years and younger and 13936 (15.1%) in patients older than 70 years. Among admitted individuals with COVID-19, 51382 (55.6%) were female. Females were more common than males in all age groups except in individuals younger than 10 years (Figure 3).

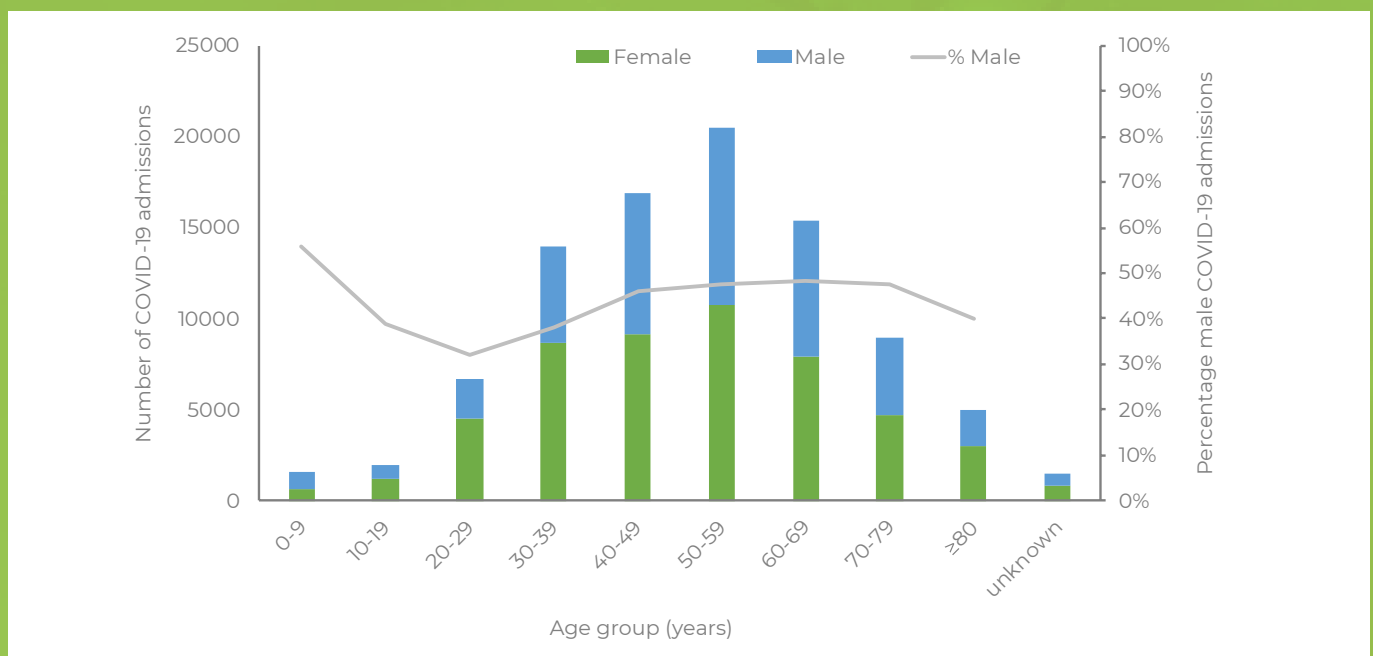


Figure 3. Number of reported COVID-19 admissions by age, gender and percentage of males, South Africa, 5 March-24 October 2020, n=92420

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Of the 62361 (67.5%) patients for whom race was known, 48732 (78.1%) were Black African, 4079 (6.5%) were Coloured, 3686 (5.9%) were Indian, 5721 (9.2%) were White and 143 (0.2%) were classified as Other race group. There were 4317 (4.7%) health care workers (HCW) that were reported to be hospitalised. Among the 23215 admissions in females of child-bearing age 15-50 years, there were 1803 (7.8%) females admitted who were pregnant or within 6 weeks post-partum.

Among 66396 (71.8%) patients for whom comorbid conditions were known, 29302 (44.1%) had no comorbid condition reported, 19170 (28.9%) had one comorbid condition reported, 13037 (19.6%) had two comorbid conditions and 4887 (7.4%) had three or more comorbid conditions reported. The most commonly reported comorbidities were hypertension (24286, 35.9%) and diabetes (18030, 26.7%); there were 5827 (8.6%) patients who were HIV-infected, 1162 (1.7%) patients with active tuberculosis (TB) and 1778 (2.6%) patients with previous history of TB (Table 2). Obesity, defined by body mass index where available or by the subjective opinion of the attending HCW, while not consistently recorded for all reported COVID-19 admissions, was recorded as a risk factor in 2699 (2.9%) of all patients hospitalised.

Table 2. Reported comorbid conditions among COVID-19 admissions, South Africa, 5 March-24 October 2020, n=66396*

Comorbid disease*	n	%
Hypertension	24286	35,9
Diabetes mellitus	18030	26,7
Chronic cardiac disease	2002	3,0
Chronic pulmonary disease/ Asthma	4468	6,6
Chronic renal disease	1823	2,7
Malignancy	624	0,9
HIV	5827	8,6
Active tuberculosis	1162	1,7
Previous history of tuberculosis	1778	2,6

* Multiple comorbid conditions are counted more than once so the total number may be more than the total number of individuals reporting comorbid conditions.

** Presence of a comorbid condition includes only the conditions reported in the table; obesity is not included.

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OUTCOMES

Of the 92420 admitted individuals, 5116 (5.5%) were currently in hospital, 70013 (75.8%) were discharged alive, 1640 (1.8%) were transferred out to either higher-level care or step-down facilities, 15651 (16.9%) had died in hospital. There were 873 additional deaths since the last report, some of these being new admissions and some historical data submitted by newly participating hospitals. Of the 85664 COVID-19 patients who had recorded in-hospital outcome (died and discharged), the case fatality ratio (CFR) was 18.3%.

EPIDEMIOLOGICAL AND GEOGRAPHIC TRENDS IN MORTALITY

In the first few weeks of the outbreak most deaths were reported in the private sector, since week 17 a higher proportion of reported deaths was in the public sector, and since week 31 again most deaths were reported in the private sector. The CFR was higher in the public health sector (21,7%) than in the private health sector (15.4%) ($p < 0.001$). There has been a decrease in reported COVID-19 deaths since week 30 (Figure 4).

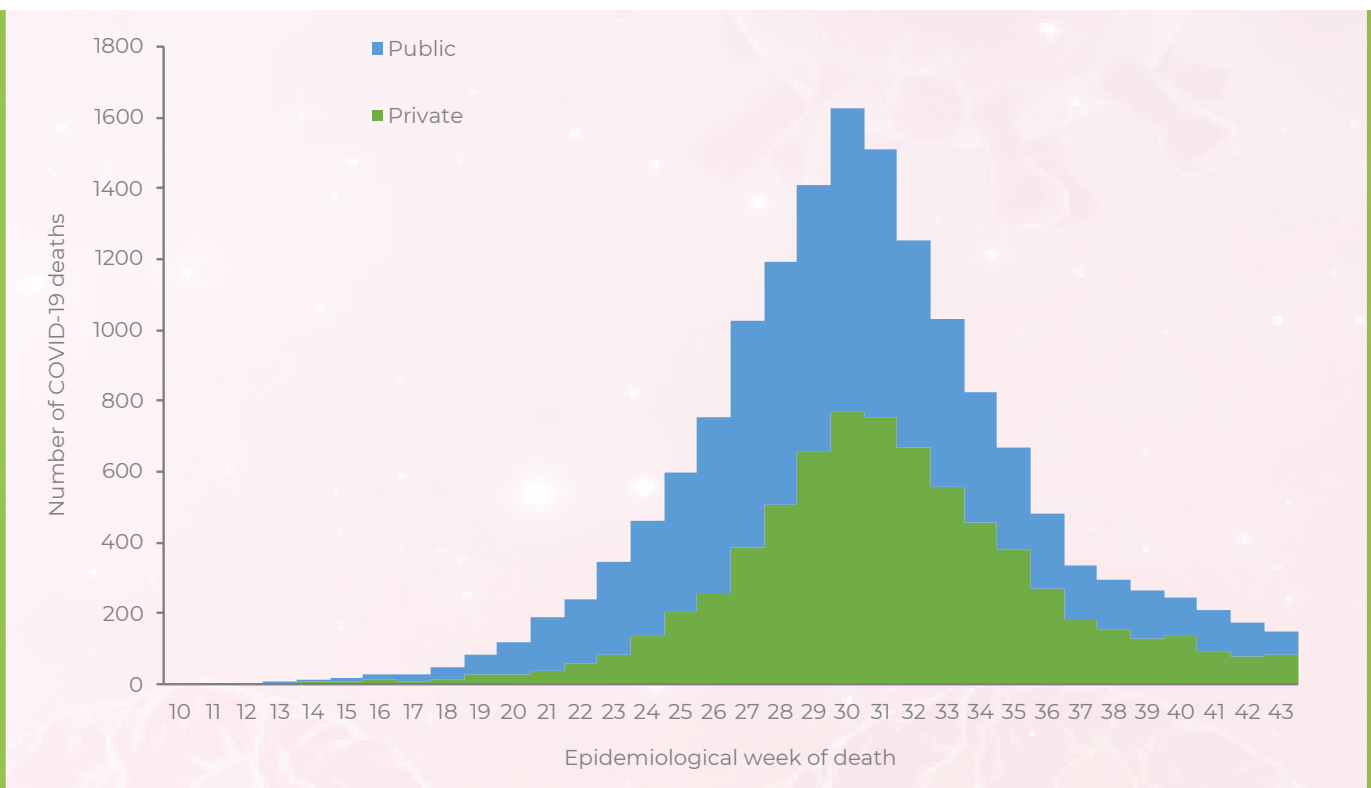


Figure 4: Number of COVID-19 deaths reported per week by health sector and epidemiologic week, South Africa, 5 March-24 October 2020, n=15651

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Most deaths were reported in Gauteng (3899, 24.9%), followed by Western Cape (3635, 23.2%), Eastern Cape (3320, 21.2%) and KwaZulu-Natal (2239, 14.3%) (Figure 5).

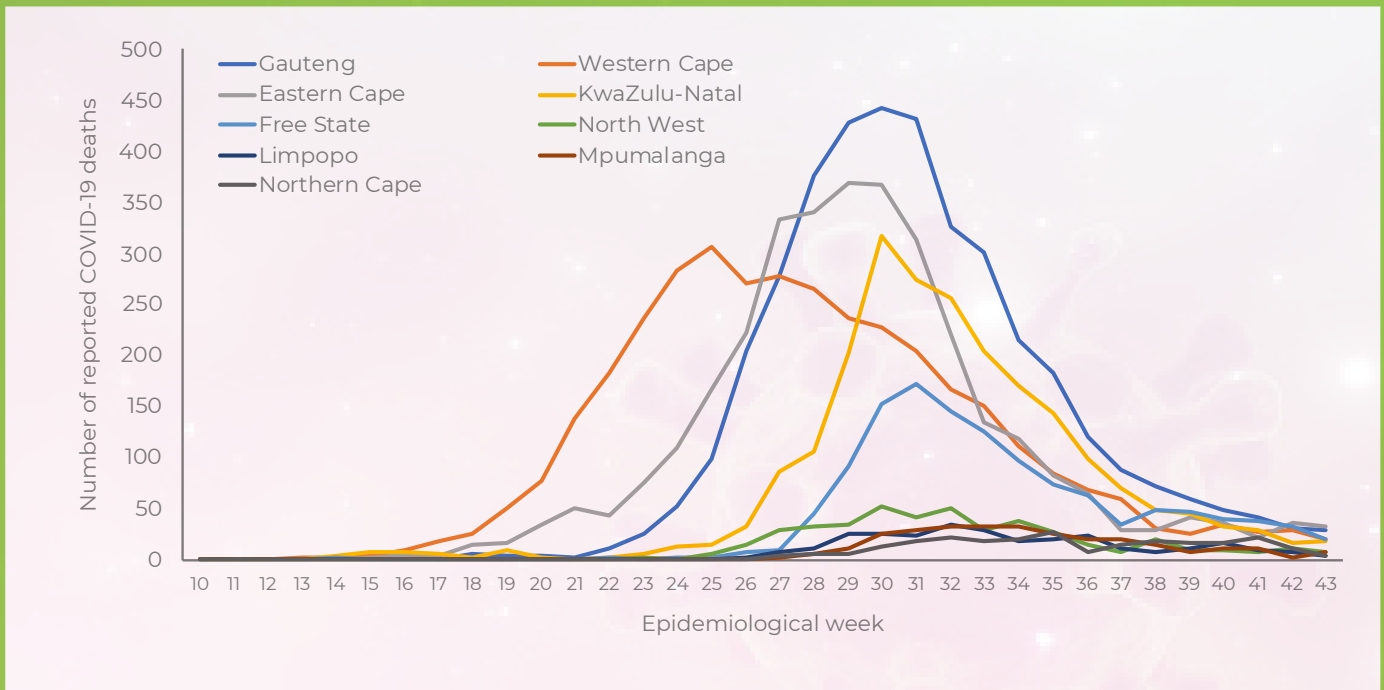


Figure 5: Number of reported COVID-19 deaths, by province and epidemiological week of death, South Africa, 5 March-24 October 2020, n=15651

DEMOGRAPHIC CHARACTERISTICS OF DEATHS

The median age of patients who died was 63 (IQR 53 – 73) years, and for those who were discharged alive was 49 (IQR 37 – 60) years. There were 72 (0.5%) deaths in children aged ≤ 18 years, many of these deaths were in children with serious underlying comorbid conditions. There were 1133 (7.2%) deaths in patients younger than 40 years (Figure 6). The CFR was higher in males (21.1%) than females (16.0%) ($p < 0.001$).

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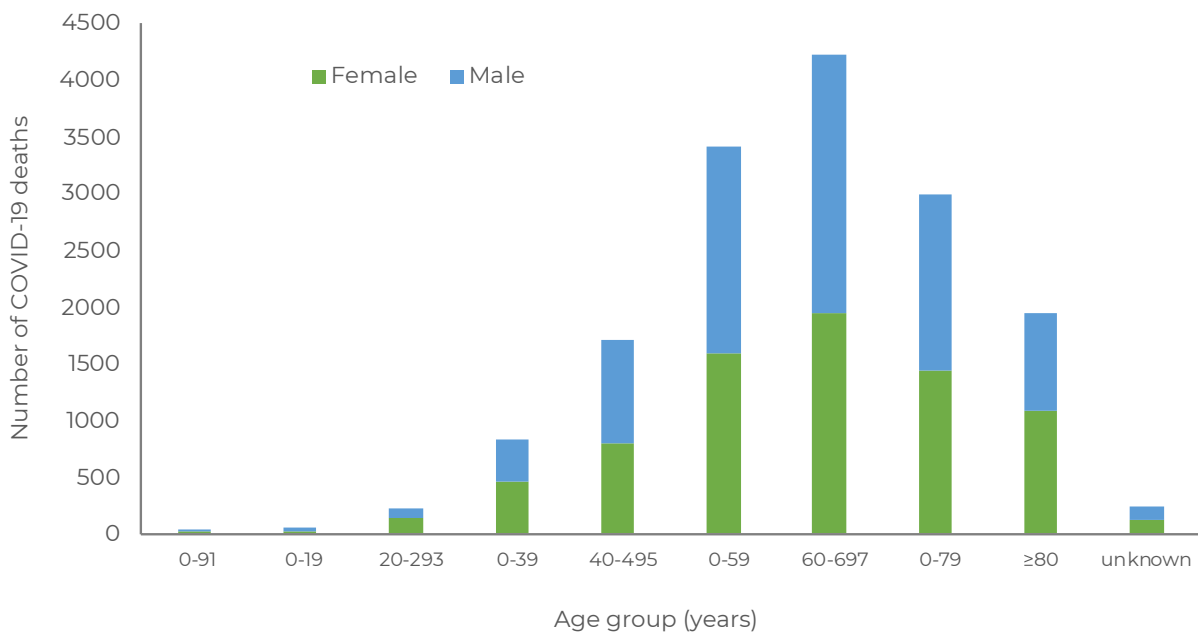


Figure 6: Number of reported COVID-19 deaths by age and gender, South Africa, 5 March-24 October 2020, n=15651

COMMON COMORBIDITIES REPORTED AMONG DEATHS

In all age groups older than 40 years, hypertension and diabetes were most commonly reported comorbidities among patients who died. In patients between 20 and 60 years, HIV, tuberculosis and obesity were commonly reported (Figure 7).

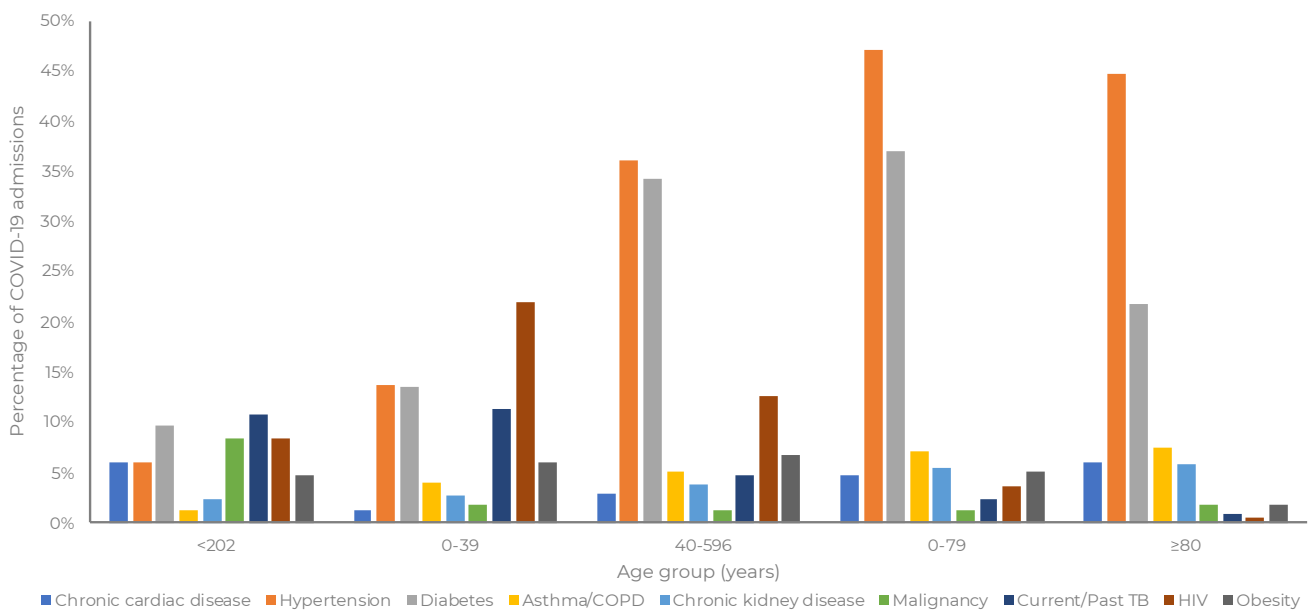


Figure 7: Frequency of comorbid conditions for reported COVID-19 deaths by age group, South Africa, 5 March-24 October 2020, n=15651

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FACTORS ASSOCIATED WITH IN-HOSPITAL MORTALITY

On multivariable analysis, factors associated with in-hospital mortality were older age groups; male sex; Black African, Coloured and Indian race; admission in the public sector; and having comorbid hypertension, diabetes, chronic cardiac disease, chronic renal disease, malignancy, HIV, current tuberculosis alone or both current and past tuberculosis, and obesity. Compared to the Western Cape Province, individuals hospitalised in Eastern Cape, Free State, Gauteng, Limpopo and Northern Cape provinces were more likely to die in-hospital (Table 3 and Figure 8).

Table 3: Univariate and multivariable analysis of factors associated with mortality among 56639 individuals with in-hospital outcome (discharges and deaths), South Africa, 5 March-24 October 2020

Characteristic	Case-fatality ratio n/N (%)	Unadjusted (95% CI)	OR	p-value	Adjusted (95% CI)	OR*	p-value
Age group							
<20 years	83/3169 (2.6)	Reference			Reference		
20-39 years	1050/19004 (5.5)	2.2 (1.7-2.7)		<0.001	2.2 (1.6-3.0)		<0.001
40-59 years	5106/34806 (14.7)	6.4 (5.1-8.0)		<0.001	6.0 (4.4-8.2)		<0.001
60-79 years	7217/22598 (31.9)	17.4 (14.0-21.7)		<0.001	15.3 (11.2-21.0)		<0.001
≥80 years	1945/4702 (41.4)	26.2 (20.9-32.9)		<0.001	31.0 (22.5-42.7)		<0.001
Unknown age	250/1385 (18.1)	8.2 (6.3-10.6)		<0.001	8.2 (3.6-19.0)		<0.001
Sex							
Female	7612/47555 (16.0)	Reference			Reference		
Male	8037/38026 (21.1)	1.4 (1.4-1.5)		<0.001	1.5 (1.4-1.5)		<0.001
Race							
White	1088/5453 (20.0)	Reference			Reference		
Black	8513/45055 (18.9)	0.9 (0.9-1.0)		0.060	1.3 (1.2-1.4)		<0.001
Coloured	760/3751 (20.3)	1.0 (0.9-1.1)		0.716	1.4 (1.2-1.6)		<0.001
Indian	689/3538 (19.5)	1.0 (0.9-1.1)		0.578	1.3 (1.2-1.5)		<0.001
Other	22/119 (18.5)	0.9 (0.6-1.5)		0.692	1.2 (0.6-2.4)		0.572
Unknown	4579/27748 (16.5)	0.8 (0.7-0.9)		<0.001	1.2 (1.1-1.3)		<0.001
Healthcare worker							
No	15291/81611 (18.7)	Reference					
Yes	360/4053 (8.9)	0.4 (0.4-0.5)		<0.001			
Peri-partum							
No	1371/19665 (7.0)	Reference					
Yes	33/1762 (1.9)	0.3 (0.2-0.4)		<0.001			

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Comorbid condition						
No co-morbidity	3275/27831 (11.8)	Reference				
1 co-morbid condition	3784/18094 (20.9)	2.0 (1.9-2.1)	<0.001			
2 comorbid conditions	3493/12281 (28.4)	3.0 (2.8-3.1)	<0.001			
≥3 comorbid conditions	1562/4625 (33.8)	3.8 (3.6-4.1)	<0.001			
Unknown	3537/22833 (15.5)	1.4 (1.3-1.4)	<0.001			
Hypertension						
No	5612/38897 (14.4)	Reference				
Yes	6265/22945 (27.3)	2.2 (2.1-2.3)	<0.001	1.1 (1.1-1.2)		<0.001
Diabetes mellitus						
No	6716/44069 (15.2)	Reference		Reference		
Yes	5003/17181 (29.1)	2.3 (2.2-2.4)	<0.001	1.5 (1.4-1.6)		<0.001
Chronic cardiac disease						
No	10556/57155 (18.5)	Reference		Reference		
Yes	630/1842 (34.2)	2.3 (2.1-2.5)	<0.001	1.2 (1.1-1.4)		0.001
Chronic pulmonary disease/Asthma						
No	10116/54488 (18.6)	Reference				
Yes	967/4273 (22.6)	1.3 (1.2-1.4)	0.001			
Chronic renal disease						
No	10404/57087 (18.2)	Reference		Reference		
Yes	731/1737 (42.1)	3.3 (3.0-3.6)	<0.001	1.6 (1.5-1.8)		<0.001
Malignancy						
No	10851/58025 (18.7)	Reference		Reference		
Yes	222/570 (39.0)	2.8 (2.3-3.3)	<0.001	2.2 (1.8-2.7)		<0.001
HIV						
No	9704/52020 (18.7)	Reference		Reference		
Yes	1091/4964 (22.0)	1.2 (1.1-1.3)	<0.001	1.6 (1.4-1.7)		<0.001
Tuberculosis						
No	10289/56291 (18.3)	Reference		Reference		
Previous	279/1054 (26.5)	1.6 (1.4-1.8)	<0.001	1.3 (1.1-1.5)		0.005
Current	98/399 (24.6)	1.5 (1.2-1.8)	0.001	1.7 (1.3-2.2)		<0.001
Current and previous	129/543 (23.8)	1.4 (1.1-1.7)	0.001	1.8 (1.4-2.3)		<0.001
Obesity						
No	7974/42460 (18.8)	Reference		Reference		
Yes	823/2341 (35.2)	2.3 (2.1-2.6)	<0.001	2.1 (1.9-2.4)		<0.001
Unknown	6854/40863 (16.8)	0.9 (0.8-0.9)	<0.001	1.0 (0.9-1.0)		0.310

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Month of admission					
March	23/207 (11.1)	Reference		Reference	
April	188/1268 (14.8)	1.4 (0.9-2.2)	0.159	1.3 (0.8-2.2)	0.248
May	1030/5813 (17.7)	1.7 (1.1-2.7)	0.015	1.4 (0.9-2.3)	0.172
June	3312/17694 (18.7)	1.8 (1.2-2.8)	0.006	1.5 (0.9-2.4)	0.112
July	6737/34099 (19.8)	2.0 (1.3-3.0)	0.002	1.5 (0.9-2.5)	0.073
August	2991/16694 (17.9)	1.7 (1.1-2.7)	0.012	1.3 (0.8-2.0)	0.353
September	999/6964 (14.4)	1.3 (0.9-2.1)	0.191	0.9 (0.6-1.5)	0.670
October	367/2914 (12.6)	1.2 (0.7-1.8)	0.533	0.7 (0.4-1.2)	0.219
Health sector					
Private sector	7187/46650 (15.4)	Reference		Reference	
Public sector	8464/39014 (21.7)	1.5 (1.5-1.6)	<0.001	1.5 (1.4-1.5)	<0.001
Province					
Western Cape	3635/18740 (19.4)	Reference		Reference	
Eastern Cape	3320/11139 (29.8)	1.8 (1.7-1.9)	<0.001	1.8 (1.6-1.9)	<0.001
Free State	1270/6247 (20.3)	1.1 (0.9-1.1)	0.108	1.2 (1.1-1.4)	<0.001
Gauteng	3899/26487 (14.7)	0.7 (0.7-0.8)	<0.001	1.2 (1.1-1.3)	<0.001
KwaZulu-Natal	2239/13645 (16.4)	0.8 (0.8-0.9)	<0.001	1.1 (0.9-1.2)	0.247
Limpopo	294/1541 (19.1)	1.0 (0.9-1.1)	0.761	1.5 (1.3-1.8)	<0.001
Mpumalanga	293/2176 (13.5)	0.6 (0.6-0.7)	<0.001	1.0 (0.9-1.2)	0.848
North West	453/4177 (10.9)	0.5 (0.5-0.6)	<0.001	1.1 (0.9-1.3)	0.112
Northern Cape	248/1512 (16.4)	0.8 (0.7-0.9)	0.004	1.2 (1.0-1.5)	0.025
Ever ICU					
No	10278/74296 (13.8)	Reference			
Yes	5336/11261 (47.4)	5.6 (5.4-5.9)	<0.001		
Ever High Care					
No	13319/77606 (17.2)	Reference			
Yes	2295/7951 (28.9)	2.0 (1.9-2.1)	<0.001		
Ever ventilated					
No	11899/80008 (14.9)	Reference			
Yes	3715/5549 (67.0)	11.6 (10.9-12.3)	<0.001		
Ever on oxygen					
No	8045/57137 (14.1)	Reference			
Yes	7569/28420 (26.6)	2.2 (2.1-2.3)	<0.001		

* Multivariable model excluded all individuals with unknown comorbid conditions

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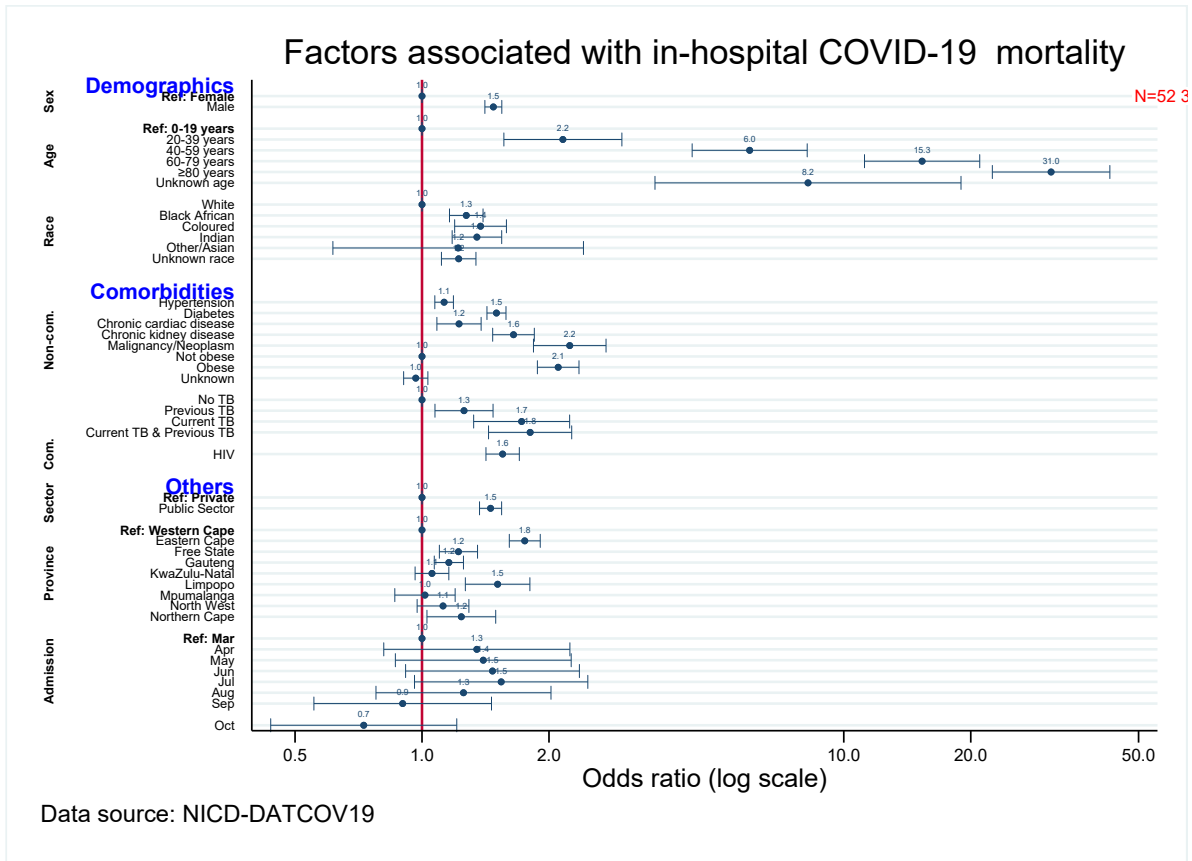


Figure 8: Multivariable analysis of factors associated with mortality among 56639 individuals with in-hospital outcome (discharges and deaths), South Africa, 5 March-24 October 2020

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DISCUSSION

DATCOV currently includes 92420 admissions from 605 public and private hospitals in all nine provinces in South Africa. It also includes 15651 deaths that have occurred to date.

The findings confirm factors associated with in-hospital mortality were older age groups; male sex; Black, Indian and Coloured race; and having comorbid hypertension, diabetes, chronic cardiac disease, chronic renal disease, malignancy, HIV, current and previous tuberculosis, and obesity. Increased risks for mortality have similarly been observed in non-white patients and in those from lower socio-economic groups in other countries (1)(2).

Trends in CFR over time and provincial differences may be affected by many factors such as hospital admission criteria, timeousness of closing cases, testing criteria in different provinces, and the severity of illness in admitted cases.

The availability of reliable surveillance data is of critical importance to gain a better understanding of the epidemiology of COVID-19 in South Africa, to monitor the COVID-19 epidemic and to respond with adequate control measures. It has been suggested that when local transmission is widespread and testing strategies change, hospital admission or mortality surveillance systems provide a more reliable picture of the epidemic progression than overall confirmed case numbers.

DATCOV provides real-time data and summary analyses, which inform modelling and reporting at a national level. It also addresses a knowledge gap, in the lack of data from low and middle income countries (LMIC), allowing for analysis of COVID-19 epidemiology in a country with a younger population, unique disease profile with epidemics of both infectious (HIV and tuberculosis) and non-communicable diseases, and an overburdened public health system.

LIMITATIONS

DATCOV is a sentinel surveillance system and does not include all hospitals with COVID-19 admissions and therefore may not be truly representative of hospital admissions for COVID-19 throughout South Africa. DATCOV only reports hospital-based admissions and deaths and therefore does not include deaths occurring outside hospitals. Data quality in a surveillance system is dependent on the information submitted by healthcare institutions. It is not possible for the NICD to verify or check the quality of all these data, however, the NICD has built-in data quality checks.

In patients with non-communicable diseases, the current data collection platform is not able to distinguish between those that had pre-existing disease and those that were newly-diagnosed; and between those with well or poorly controlled disease. New variables have been introduced to allow for this analysis. For obesity, the platform now also captures weight, height and BMI.

Data on socioeconomic status are not collected. Data on treatment and medical interventions have not been analysed because the data were incomplete. Efforts are ongoing to improve the quality and completeness of data on symptom of these data will be included in future reports.

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2. Pan D, Sze S, Minhas JS, Bangash MN, Pareek N, Divall P, et al. The impact of ethnicity on clinical outcomes in COVID-19: A systematic review. EClinicalMedicine. 2020;23.

ACKNOWLEDGEMENTS

All public and private sector hospitals submitting data to DATCOV

Private hospital groups submitting data to DATCOV:

- Netcare
- Life Healthcare
- Mediclinic Southern Africa
- National Hospital Network (NHN)
- Clinix Health Group
- Lenmed
- Joint Medical Holdings (JMH)

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APPENDIX

Table 4: Number of reported COVID-19 admissions and deaths by age and gender, South Africa, 5 March-24 October 2020

ADMISSIONS					DEATHS			
Age (years)	Female	Male	Unknown	Total	Female	Male	Unknown	Total
0-4	514	651	2	1167	12	9	0	21
5-9	165	207	0	372	2	5	0	7
10-14	303	272	0	575	4	7	0	11
15-19	918	503	1	1422	17	27	0	44
20-24	1538	784	2	2324	44	29	0	73
25-29	2975	1346	2	4323	95	55	1	151
30-34	4123	2273	3	6399	187	118	0	305
35-39	4524	3042	3	7569	268	253	0	521
40-44	4357	3577	8	7942	315	375	0	690
45-49	4780	4184	7	8971	478	533	0	1011
50-54	5354	4769	2	10125	660	753	0	1413
55-59	5384	4931	4	10319	938	1054	0	1992
60-64	4452	4258	3	8713	973	1215	0	2188
65-69	3469	3181	0	6650	979	1052	0	2031
70-74	2658	2477	1	5136	771	854	0	1625
75-79	2022	1775	1	3798	673	700	0	1373
80-84	1504	1105	1	2610	511	457	0	968
85-89	965	577	0	1542	346	267	0	613
90-94	420	237	0	657	179	124	0	303
>95	117	76	0	193	42	19	0	61
Unknown	840	663	110	1613	118	131	1	250
	51382	40888	150	92420	7612	8037	2	15651